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ABSTRACT

The document lists needed materials, specifications, and procedures for constructing five devices to assist the handicapped: (1) a wobble stick toy control switch; (2) adaptive pointers for use with a manual pointing board; (3) slide-away laptray for use on wheelchairs; (4) a swing-away lapboard made of transparent materials, to be used as a communication board support on wheelchairs; and (5) a folding communication board, constructed as a 3-panel folding case with pockets for inserting symbol displays. Each design includes detailed illustrations. (JDD)

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APPLICATION AND CONSTRUCTION NOTES FOR LAPTRAYS AND ADAPTIVE POINTERS

Wobble Stick Toy Control
Adaptive Pointers
Slide-Away Laptray
Swing-Away Lapboard
Folding Communication Board

By

Ben Brown, Cinda Bottorf, Donna DePape, and Gregg Vanderheiden

1980 - 1982

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Table of Contents

	Page
Wobble Stick Toy Control	1
Adaptive Pointers	6
Slide-Away Laptray	11
Swing-Away Lapboard	15
Folding Communication Board	34

WOBBLE STICK TOY CONTROL SWITCH

Ben Brown, Ed.D.
Cinda Bottorf
Gregg Vanderheiden

1980

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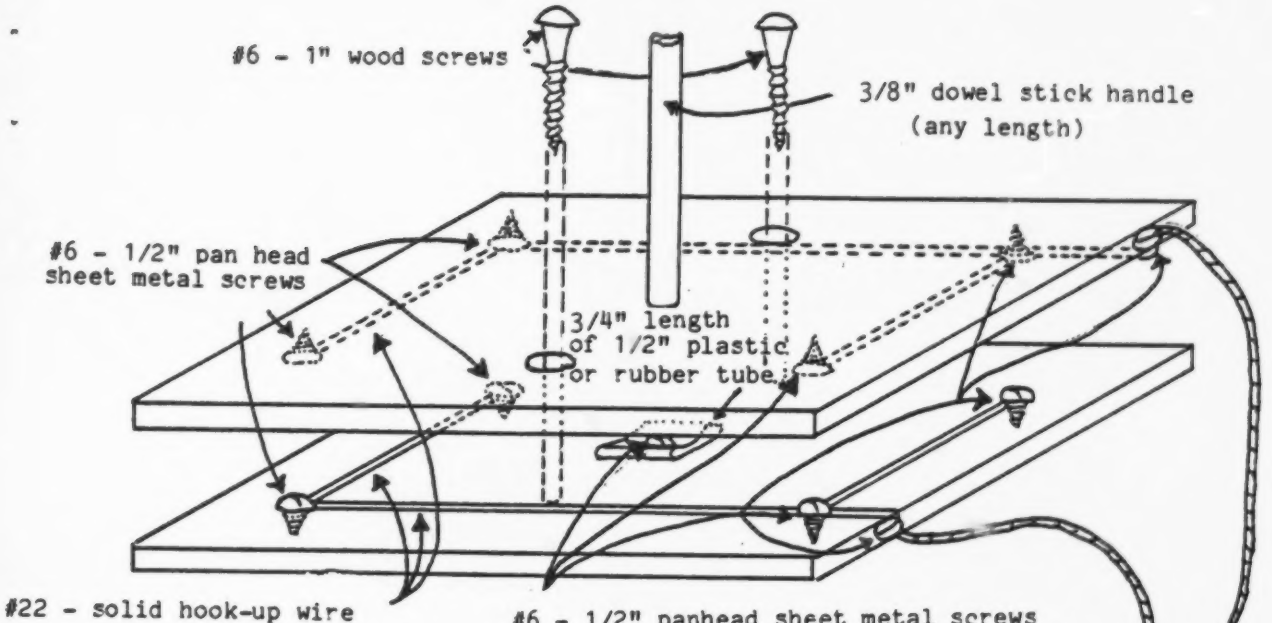
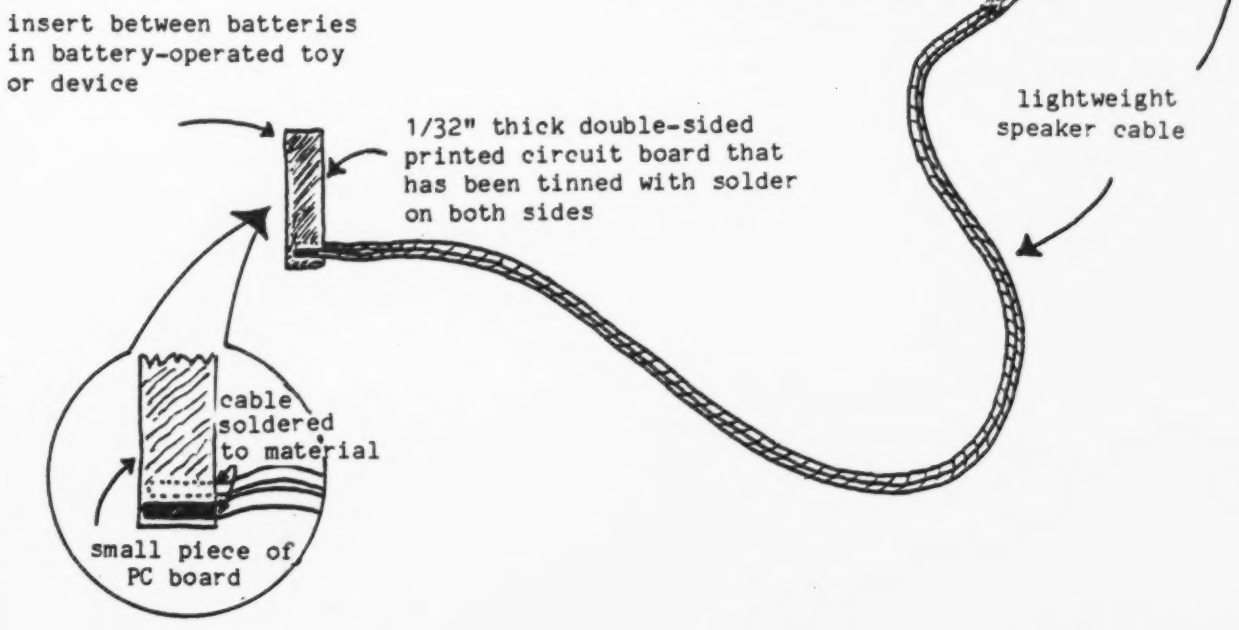
WOBBLE STICK TOY CONTROL SWITCH



TOY CONTROL CONNECTOR



TOY CONTROL SWITCH AND CONNECTOR

MATERIALS

1) 2 pieces 1/2 inch plywood 4 1/4" x 7" (top to bottom)

2) 3/8 inch diameter dowel stick for handle (any length)

3) 11 (quantity) #6 1/2" panhead sheet metal screws

4) 2 (quantity) #6 1 inch roundhead wood screws

5) 3/4 inch length of 1/2 inch diameter plastic or rubber tube

6) 15 inches of #22 AWG solid hook-up wire

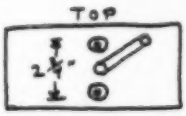
7) 24 inches of lightweight speaker cable

8) small piece of 1/32" thick (1/16" thick is okay) double sided PC board material approximately 3/8" x 1"

9) small amount of solder

Procedure

1) Cut out and sand plywood top and bottom

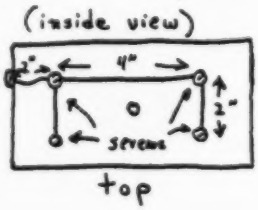


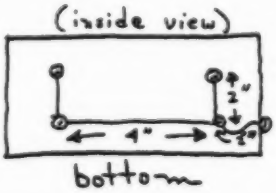
2) Drill 2 3/16" holes in top 2 3/4" apart (counter-sink holes 1/4")

3) Drill 3/8" hole in center of top and attach dowel stick

4) Cut #22 hook-up wire into 6 2-inch lengths and 2 4-inch lengths

5) Attach wires to plywood top and bottom with 1/2" sheet metal screws:



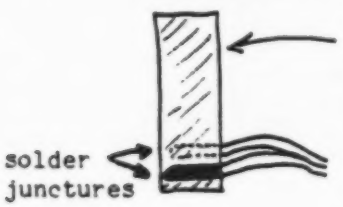


6) Attach 3/4" length of plastic or rubber tube to center of bottom with 1/2" sheet metal screw

7) Assemble top and bottom by screwing #6 1" wood screws into 2 3/16" holes drilled in top (NOTE: top and bottom should be approximately 1/4" apart; separated by plastic or rubber tube; top should be loose and wobbly)

8) Attach lightweight speaker cable to top and bottom. One strand of wire connects to screw on outside edge of top while other strand attaches to screw on bottom:

9) Attach two strands of speaker cable to toy control connector (battery insert) by soldering wires to either side of insulated material. (NOTE: wires must not make contact with each other at solder junctures - tin the battery insert by coating both sides but not the edges with solder.)



Double sided printed circuit board material covered with a thin layer of solder on each side

Speaker cable wire soldered to insert - one wire on one side and one on the other (make sure strands don't touch)

drawings and text by Ben Brown 6/80

ADAPTIVE POINTERS

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Gregg Vanderheiden

1980

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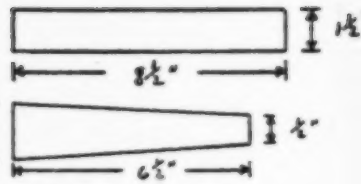
Wrist Strap Pointer*

Materials: (refer to drawing)



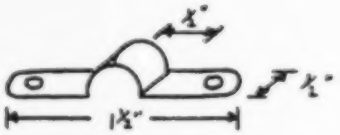
#1 - 1½" x 8½" strip of imitation leather material

#2 - 6½" strip of leather material cut on a taper with a width of 1¼" to ½"

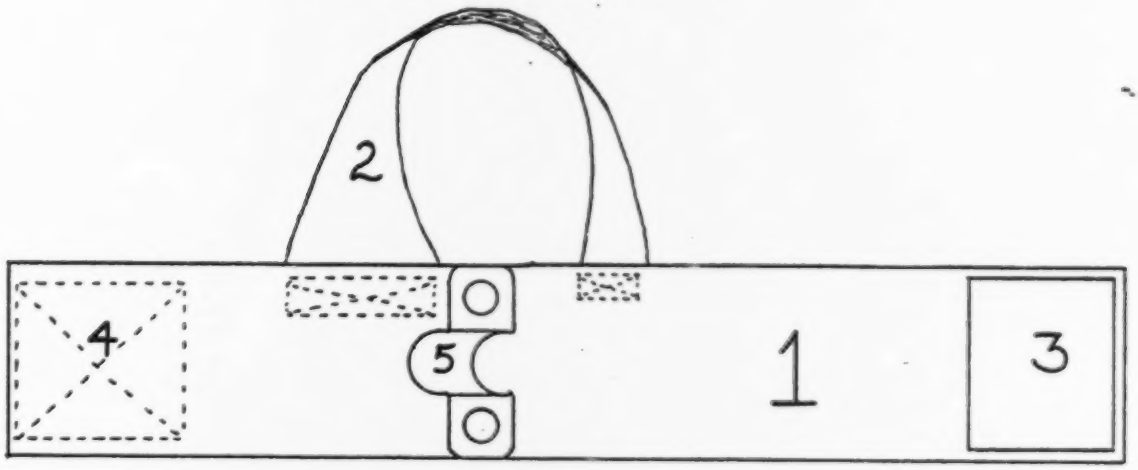
#3 - 1¼" x 1¾" patch of velcro loops material sewn to outside surface of #1 strip

#4 - 1¼" x 1¾" patch of velcro hooks material sewn to inside surface of #1 strip

#5 - Plastic conduit clamp ½" x 1½"



Note: clamp should be attached to #1 strip with "speedy rivuts".



Procedure:

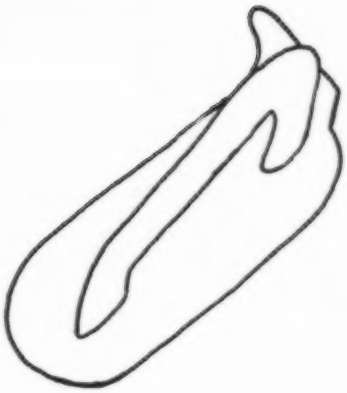
1. Cut parts #1 and #2 out of imitation leather material
2. Attach velcro patches to ends of #1 strip
3. Attach strap to user's wrist
4. Determine proper location of #2 by placing it around user's thumb

5. Mark location of #2 strip with magic marker
6. Sew #2 strip in place
7. Attach conduit clamp to #1 strip using speedy rivuts (as shown in diagram)
8. Place ½" x 1" or 1½" wooden dowel in conduit clamp - to be used as pointer
9. Cut pointer to appropriate length (note: proper length determined after observing user pointing with the wrist strap.)

Ben Brown
Positioning Specialist
Communication Aids &
Systems Clinic

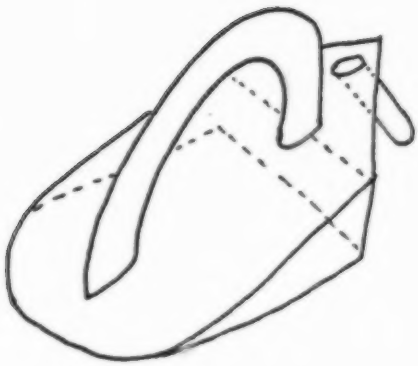
*Designed by Mrs. Edward Merchen of Danville, Illinois

Keyguard Siders



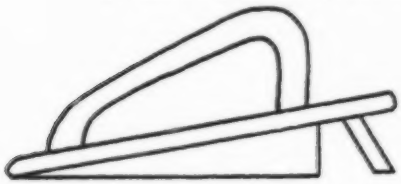
DESIGN #1 -

"MODIFIED DOLPHIN"



DESIGN #2 -

"MODIFIED DELTA"



Keyguard Sliders come in two designs for use with keyboards using keyguards such as typewriters and calculators. Proper useage requires that the slider be moved smoothly over the surface of the keyguard. Once the pointer is over the desired key, a simple wrist movement activates the key.

The first design, called the "Modified dolphin", requires either a hyperextended wrist movement or a pronated wrist movement for key activation. The second design, called the "Modified delta", however, requires only a pronated wrist movement.

If difficulty is encountered in activating desired keys, the problem may be the length or width of the pointer. To aleviate the problem, sand the pointer with a piece of fine-grain sandpaper until the desired length and/or width is achieved.

Success in using a Keyguard Slider may take time. Practice may be required to develop smooth sliding movements so that proper keys can be activated without lifting the slider from the surface of the keyboard.

Designed by: Ben Brown
Communication Aids & Systems Clinic

The "Dolphin" Pointer

The "Dolphin" pointer was designed for use as an indicator when using a manual pointing board. The design is relatively simple and the materials are readily available at most hardware and fabric stores.

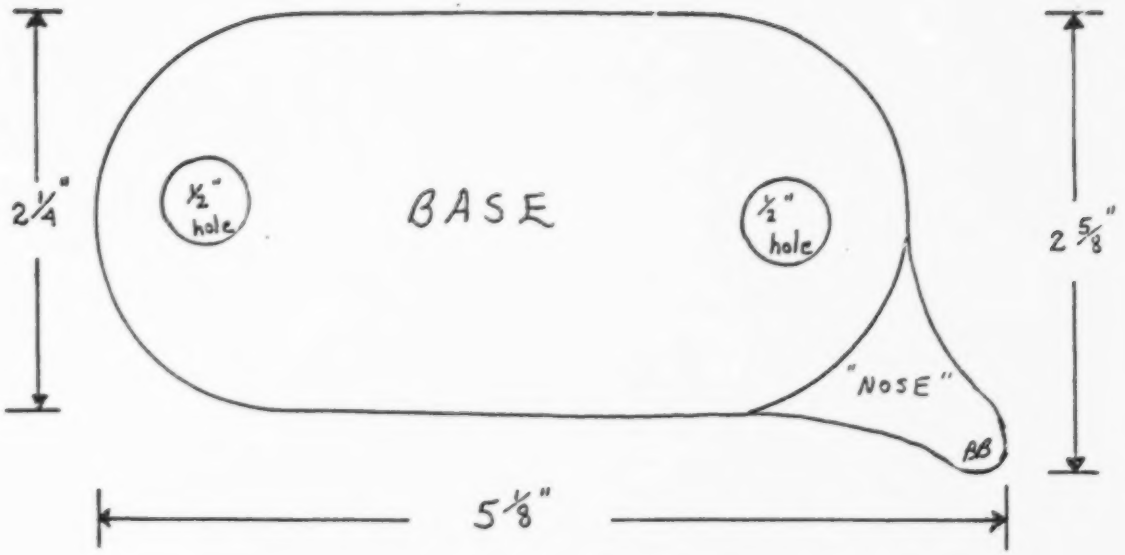
Materials

1. ¼" x 5⅛" x 2-5/8" piece of lexan sheet material
2. ½" x 6-3/4" piece of lexan rod material
3. 3 strips of 1" x 5½" self-sticking velcro loop material
4. Small amount of epoxy glue

Procedure

1. Using the enclosed pattern (or your own design), trace the base on piece of lexan sheet material.
2. Cut out the base using a band saw or sabre saw. (Note: Make sure appropriate blade for cutting plastics is used with the sabre saw).
3. Measure and cut lexan rod material.
4. Using a heat gun, heat and bend lexan rod to appropriate shape. Configuration of handle can be tailored to user's needs.
5. Place handle on base and determine appropriate location for handle anchoring holes.
6. Drill 2 holes through base using ½" drill bit - appropriate for drilling through plastic. (Note: If possible, use a drill press set at the slowest speed).
7. Using a rat-tail file, ream out the holes so handle fits snugly.
8. Before gluing handle in place, decide whether "nose" of pointer will point left or right. Attach velcro to bottom of the base and trim around the edge. (Note: Velcro will serve as a "floor" for the handle holes when applying the epoxy.)
9. Secure the handle in place with epoxy.
10. Paint the "nose" with enamel (optional)

The "Dolphin" Pointer Patterns



Designed by: Cinda Bottorf
Ben Drown

Communication Aids & Systems Clinic

INSTURCTIONS FOR FABRICATION AND ATTACHMENT OF SLIDE-AWAY LAPTRAY

Ben Brown, Ed.D.

1982

Trace Center

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Instructions for Fabrication and Attachment of Slide-away Laptray

The slide-away laptray can be used on any wheelchair with standard length armrests. To use or store the trav requires the ability to grasp the edge of the tray and pull it from the down position to the up position, or vice versa.

Measurements:

Drawing #1 (page 2)

1. Measurement A = width of wheelchair (outside armrest to outside armrest) plus 2½ inches.
2. Measurement B = desired lenth as determined by user's needs.
3. Measurement C = two-thirds the length of measurement B
4. Measurement D = depth of cut out - determined by measuring depth of user's chest, in sitting position, plus 1 inch.
5. Measurement E = width of cut out - determined by measuring width of user's chest, in sitting position, plus 1 inch.

Drawing #2 (page 3)

6. Measurement F = distance between armrests (outside edges).

Construction Hints:

1. Use ½ inch AB grade plywood for laptray.
2. Use ¾" x ¾" white pine for edging around laptray.
3. Use ¾" x 1" white pine for armrest braces.
4. Use 1/8" sheet of aluminum for armrest tongue.
5. Round all corners of laptray - sand with light grade sandpaper.
6. Apply 2 coats of polyurethane.
7. Attach armrest braces by drilling holes through top of tray -countersink screws - fill in holes with wood putty and sand smooth.

Re: construction of laptray straps: (See drawing #3)

1. Make straps from pressure sensitive velcro tape by sticking 2 pieces back to back.
2. Attach "D" ring end of strap to tray slide of armrest brace.
3. Attach other end of strap between armrest brace and tongue.

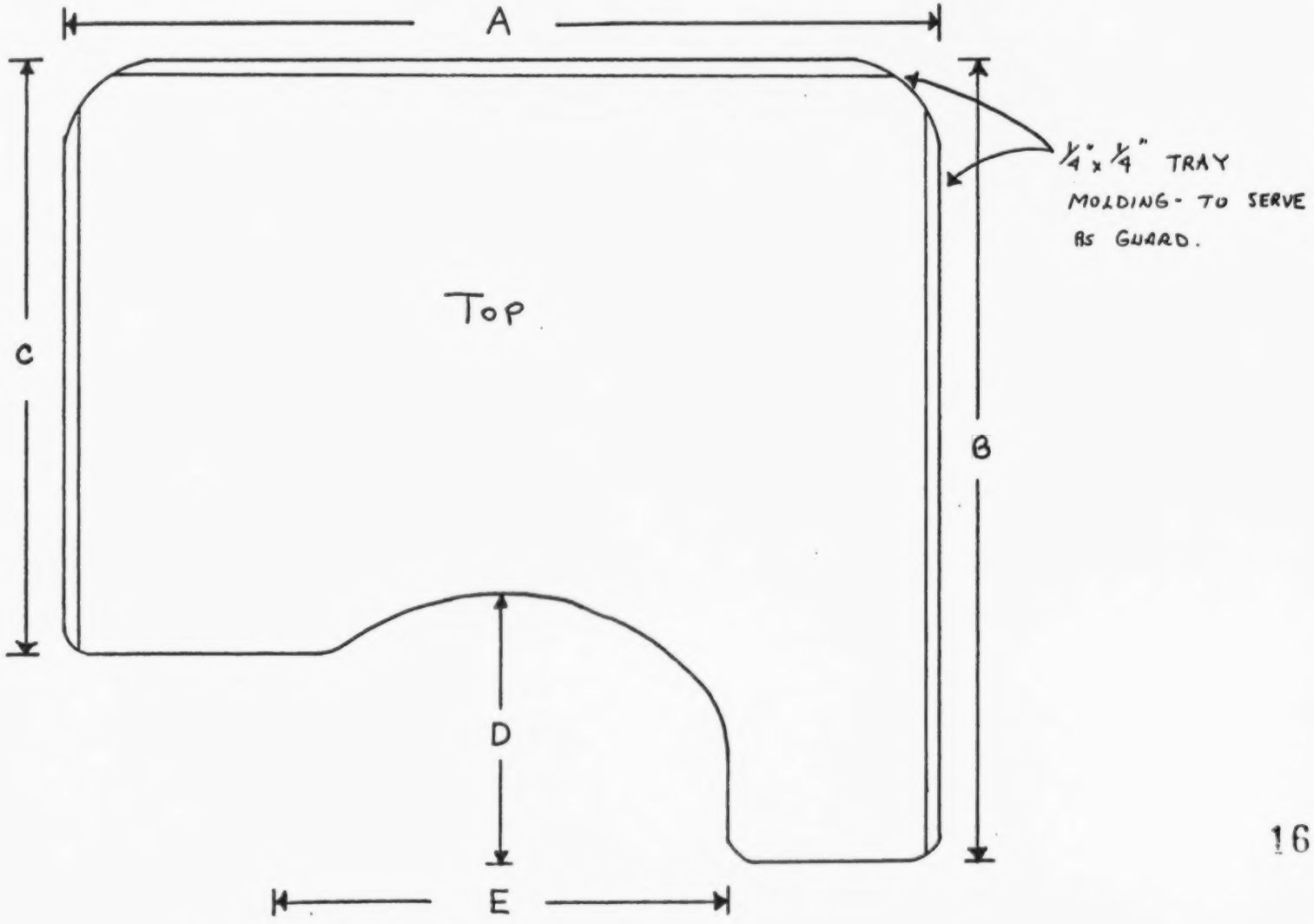
Re: attachment of laptray to wheelchair:

1. With straps unattached, place laptray on armrests with tongue and straps on that side underneath the armrest.
2. Allow "D" ring end of strap to rest on top of other armrest.
3. Connect straps by inserting longer straps through "D" rings and pull gently so that velcro hooks and loops engage.

Final notes:

1. The laptray can be designed to slide either to the user's left or right.
2. Nylon belt material and buckles can be used in place of the velcro straps and "D" rings.

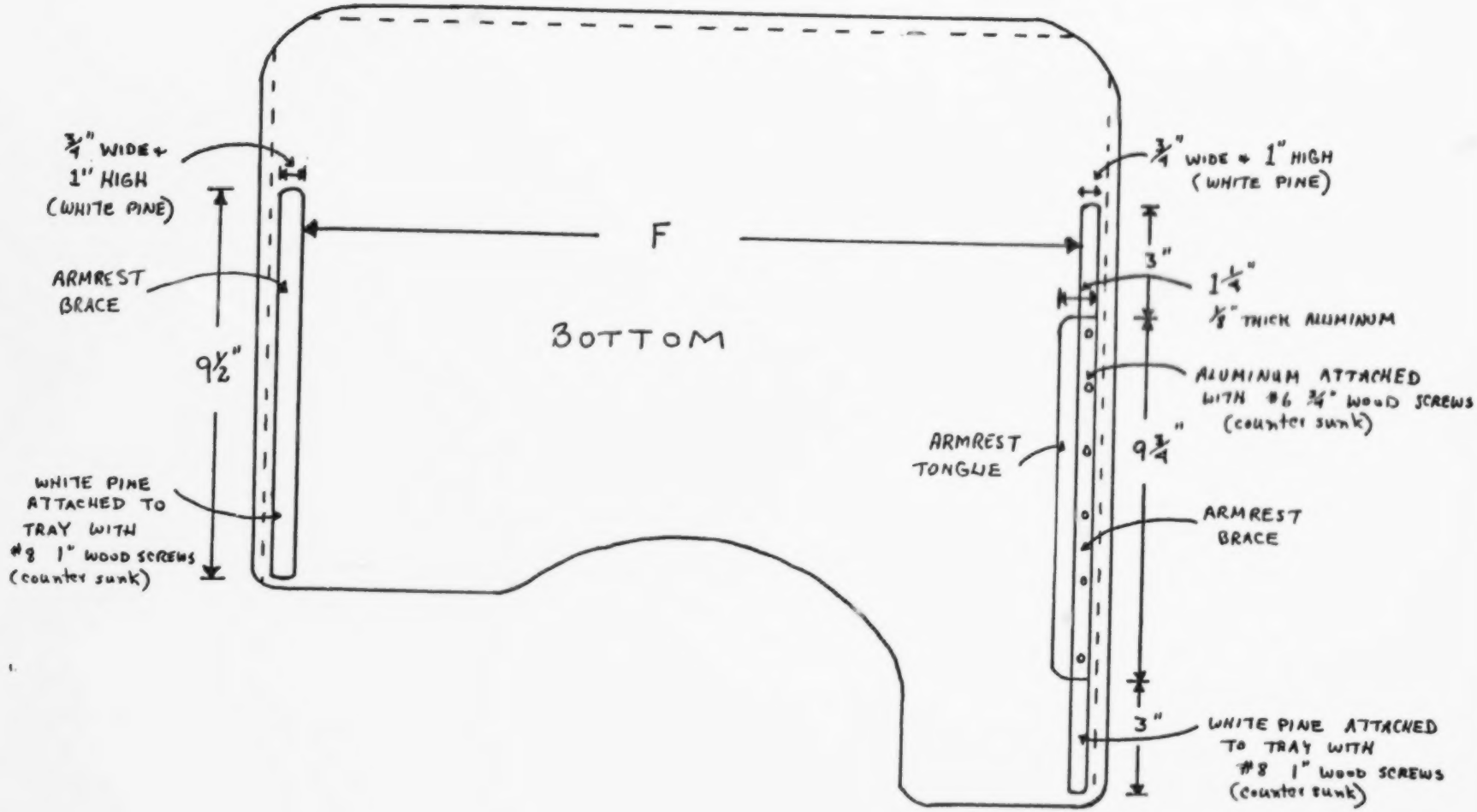
SLIDE- AWAY LAPTRAY (DRAWING #1)



16

DESIGNED BY:
BEN BROWN (CASC)

SLIDE-AWAY LAPTRAY (DRAWING #2)


3/4" WIDE x 1" HIGH (WHITE PINE)
ARMREST BRACE
9 1/2"
WHITE PINE ATTACHED TO TRAY WITH #8 1" WOOD SCREWS (counter sunk)
F
BOTTOM
3/4" WIDE x 1" HIGH (WHITE PINE)
3"
1 1/4"
1/8" THICK ALUMINUM
ALUMINUM ATTACHED WITH #6 3/4" WOOD SCREWS (counter sunk)
ARMREST TONGUE
9 3/4"
ARMREST BRACE
3"
WHITE PINE ATTACHED TO TRAY WITH #8 1" WOOD SCREWS (counter sunk)

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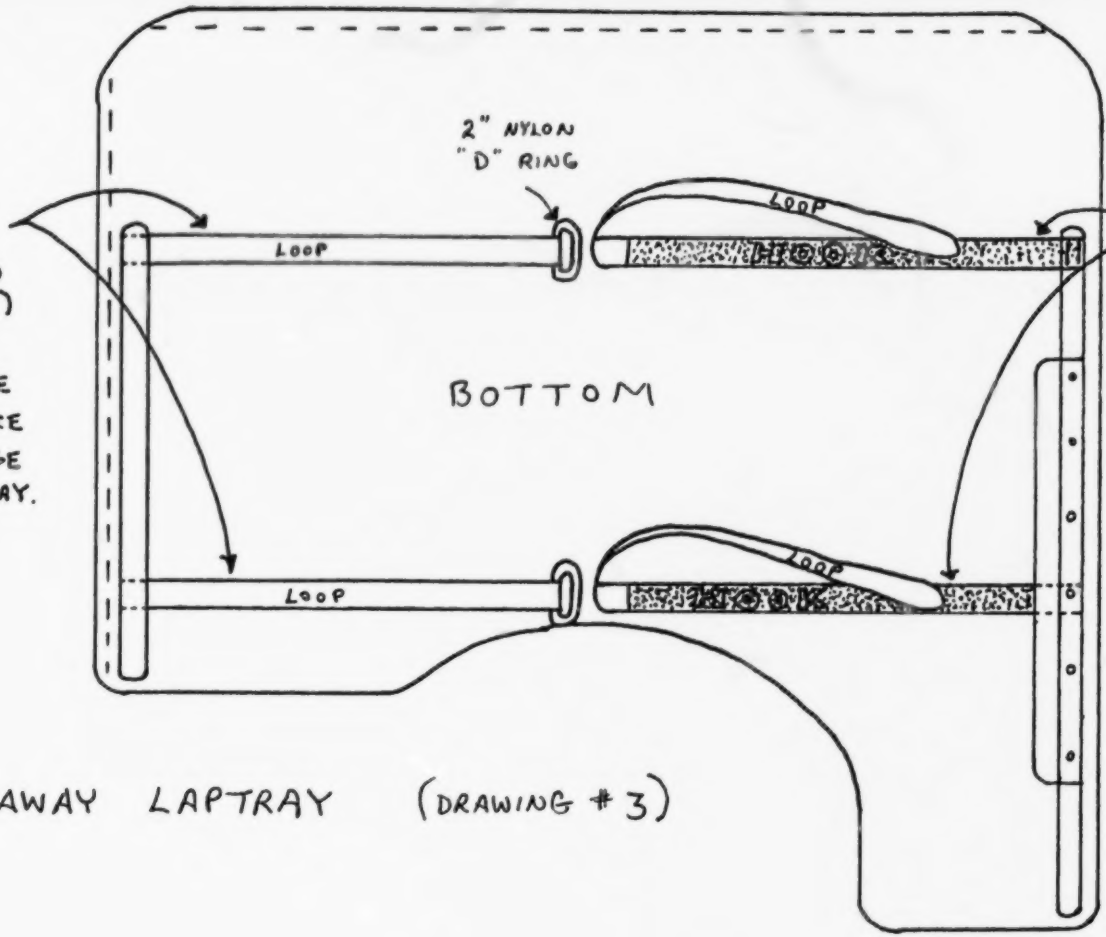
2" NYLON
"D" RING
LOOP
LOOP
2" WIDE PRESSURE SENSITIVE VELCRO TAPE (STICKY BACK) LOOP.
* LENGTH SHOULD BE TWICE THE DISTANCE FROM OUTSIDE EDGE TO CENTER OF TRAY.
BOTTOM
LOOP
LOOP
2" WIDE PRESSURE SENSITIVE VELCRO TAPE (STICKY BACK) HOOK → ATTACHED TO HALF THE LENGTH OF 2" WIDE PRESSURE SENSITIVE VELCRO TAPE (STICKY BACK) LOOP.

SLIDE-AWAY LAPTRAY (DRAWING #3)

SLIDE-AWAY LAPTRAY (DRAWING #4)

DESIGNED BY:
BEN BROWN (CASC)

INSTRUCTIONS FOR FABRICATION AND ATTACHMENT
SWING-AWAY LAPBOARD

Gregg Vanderheiden
1982

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CONSTRUCTION NOTES

INTRODUCTION

The Fold Away Communication Board Support, pictured in Figure 1, provides a handicapped individual with a retractable communication board support for their wheelchair. The support is not designed to be used as a laptray; therefore, no objects over 2 or 3 pounds should be placed on the support surface. The support can be folded up in front of the user when the communication board is needed, and down to the side of the wheelchair when finished, with a minimum amount of strength and dexterity on the part of the user. The retractable nature of the support is very useful in easily moving the communication board out of the way during transfers and working at normal tables, while still keeping the communication board within easy reach of the user. The support is constructed of a very strong material which is also transparent allowing communication boards to be mounted on the bottom of the support.

Construction of the support can be done mostly with locally available materials and common woodworking tools. The support was designed to be used with Everest and Jennings (E & J) wheelchairs with adjustable desk-length armrests. It could be fitted to other wheelchairs as long as the armrest dimensions are the same as an E & J wheelchair. It is recommended that the assembly procedure be read completely to understand the entire construction process before pur-chasing and assembling the materials. The dimensions given are for a right handed support (where the support mounts to the right arm of the wheelchair), but can easily be converted to a left handed support if required by the individual. The side the support is mounted to may be dependent upon the side the user transfers from or the side a motorized wheelchair controller is mounted to. Some changes in the dimensions may be required if special modifications have been made to the wheelchair. Figure 2 shows the relative positions of the different parts to each other.

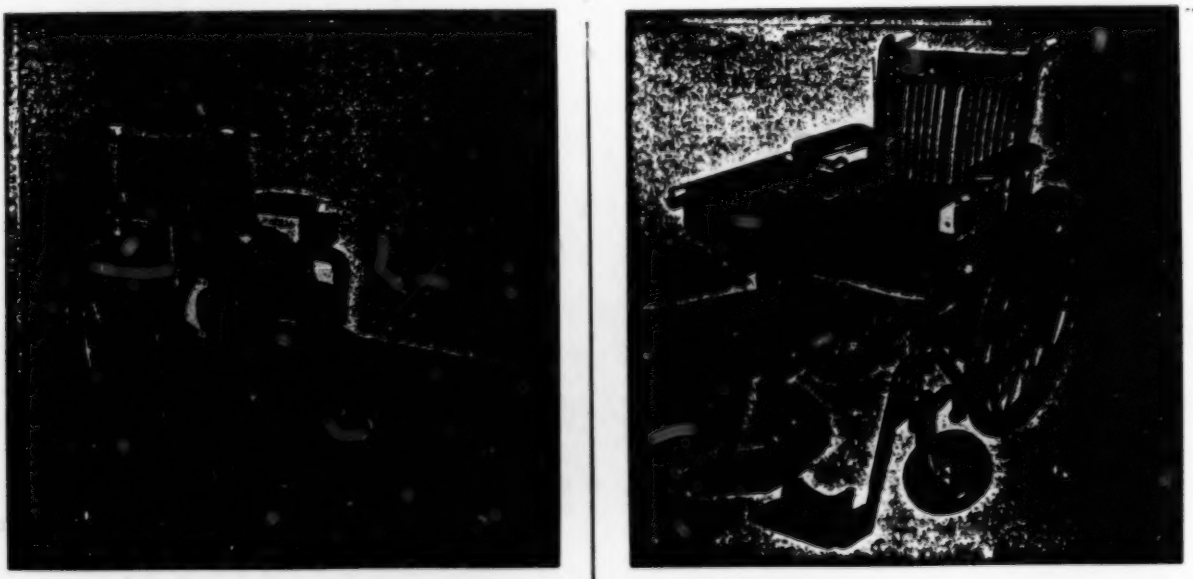
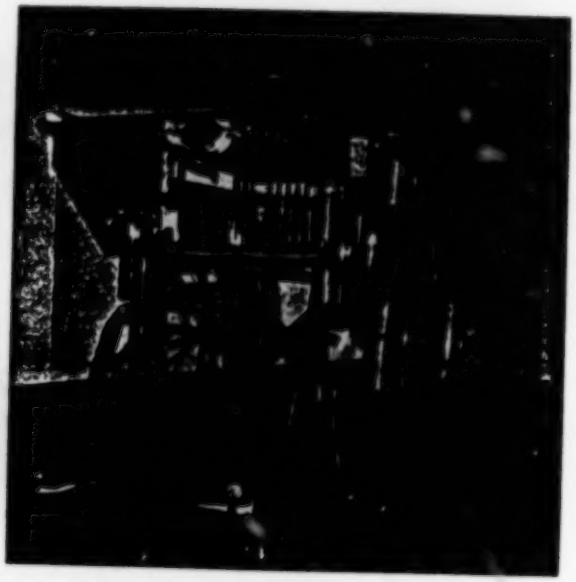
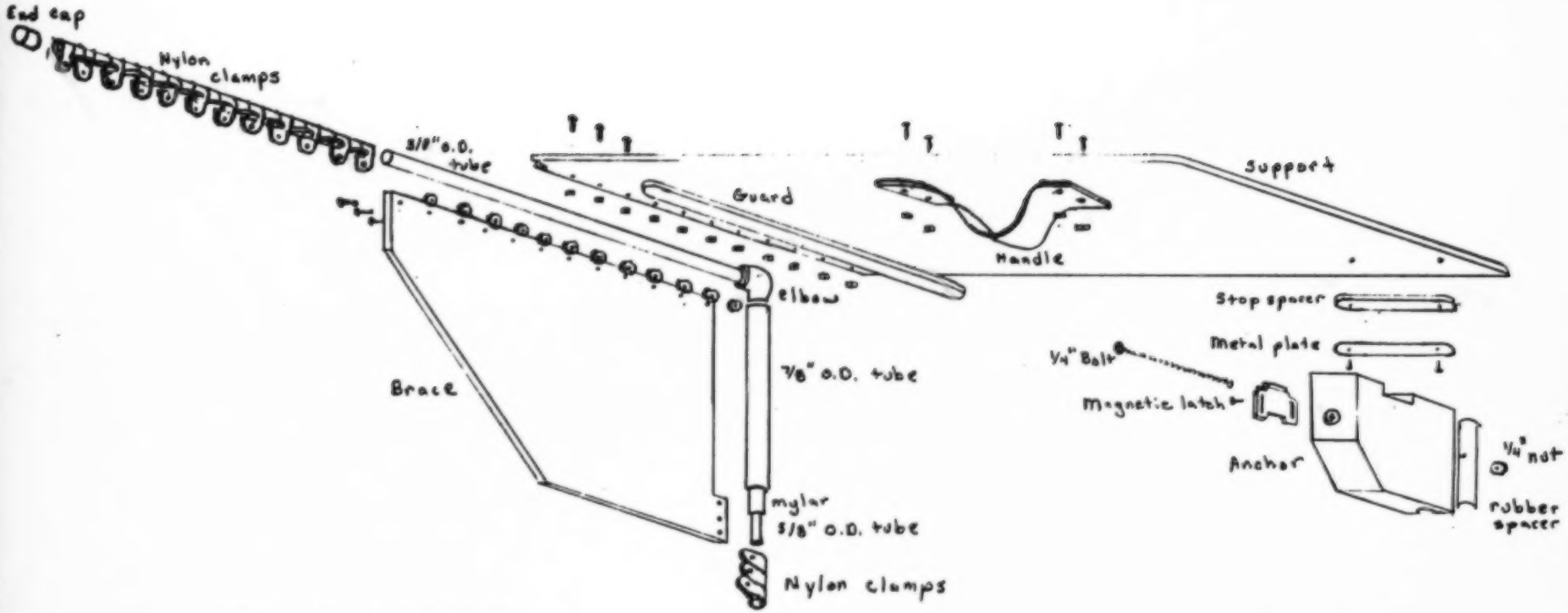


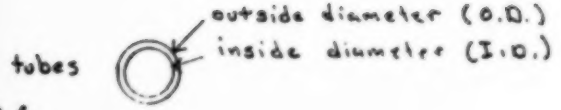
Fig. 1 Foldaway Communication Board Support



View used in Figure 2

Fig. 1A Foldaway Communication Board Support





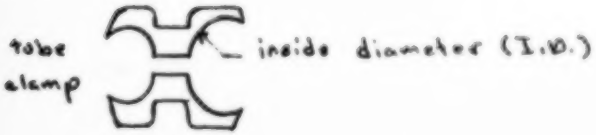


Fig. 2 Fold Away Communication Board Support

WHEELCHAIR REQUIREMENTS

The E & J wheelchair must have adjustable desk-length armrests to properly position the support relative to the individual. The support can be used in conjunction with motorized wheelchairs with the mounting on the opposite side of the chair from the control box. If the user transfers by him/herself the support should be mounted on the opposite side used for transfering. These two criteria may require redimensioning the support to be a left-handed version.

Construction Materials

Most of the materials are available from local hardware stores; however, the ZYGO clamps and the nylon clamps will need to be ordered from distributers. Polycarbonate can be purchased locally in most medium and large size cities at stores that sell plastic materials, or it can be ordered from a distributor. Distributors are listed at the end of this section.

The terms O.D. and I.D. refer to the outside diameter (O.D.) and inside diameter (I.D.) of tubes and tube clamps used in the construction of the laptray (Fig. 2). PVC tubing is a type of plastic tubing used for normal household plumbing.

Quantity	Size	Item
1	24" X 12" X 1/4"	polycarbonate sheet (Lexan)
1	12" X 12" X 1/4"	polycarbonate sheet (Lexan)
1	tube/bottle	polycarbonate adhesive
1	12 1/2" X 5/8" O.D.	PVC tubing
1	11 1/2" X 5/8" O.D.	PVC tubing
1	9 1/4" X 7/8" O.D.	PVC tubing
1	5/8" I.D.	PVC elbow
1	5/8" I.D.	PVC end cap
1	kit	PVC cleaner and cement
4	6-32 X 1/2"	flat head machine screws
26	6-32 X 1/2"	pan head machine screws
1	10-32 X 1/2"	flat head machine screw
30	6-32	nuts
1	10-32	nut
2	#6 X 3/8"	flat head sheet metal screws
1	1/4" X 4 1/2"	pan head machine bolt

1	1/4"	nut
1	1" X 4" X 1/16"	iron plate[2]
1	1 1/2" X 3 1/2" X 6"	finished pine 2 by 4
1	8" X 2"	cloth strip (i.e. canvas, webbing material)
1	9 " X 2"	10 mil. thick mylar sheet[3]
1	plastic 1" wide	magnetic cabinet latch
1	3 1/2" X 1 3/8" X 1/16"	piece of rubber (i.e. inner tube)
26	9/16"	nylon clamps #8947 H.H. Smith[4]
2	AF-2	Zygo aluminum clamps
1		broom clamp

[1] Can be cut from the 12" X 12" X 1/4" piece.
[2] Iron brackets used for joining wood together can be cut to the dimensions required and used for the iron plate.
[3] Included with these instructions
[4] Purchase at least 10 extra clamps as replacements in case some clamps break.

Distributors

ZYGO AF-2 clamps
(approximately $21/2 clamps)

ZYGO Industries
P.O. Box 1008
Portland, OR 97207
(503) 297-1724

nylon clamps #8947 H.H. Smith
(approximately $5/100 clamps)

Ohm/Electronics Inc. ($5 min. order)
P.O. Box 368
Palatine, IL 60067
(312) 359-5500

Bell Industries (100 piece min.)
3422 W. Toughy Ave
Chicago, IL 60645
(800) 323-7617

polycarbonate sheet

Central Plastics
2701 N. Pulaski Rd.
Chicago, IL 60639
(312) 235-3300

Midland Plastics
3605 N. 126th Str.
Brookfield, WI 53005
(414) 781-6520

Central Plastics
5248 27th Ave
Rockford, IL 61101
(815) 397-4465

Cadillac Plastic & Chemical
4821 N. 32nd Str
Milwaukee, WI 53209
(414) 444-7650

Central Plastics
1444 E. Washington Ave
Madison, WI 53703
(608) 256-5555

Construction tools

The recommended mininum types of tools required for construction are listed below:

Hack saw
Saber saw
Wood saw
3/8" Power drill
Drill bits 3/32", 1/8", 5/32", 3/16", 1/4", 7/8" spade bit, counter sink
Screw drivers
Wood/metal file
#120 Granet sand paper
Allen wrench 3/16"

Other useful tools:

Drill press
Band saw
Hand drill guide
Table saw

ASSEMBLY INSTRUCTIONS

The first part of the assembly, before any of the materials are cut out, requires determining the height of the support for the individual (Fig. 3). There are no hard and fast rules for determining the height of the support, but generally it is below the height of the armrests. This allows the individual to point easily to items on the support mounted communication board. The minimum height of the support from the cross tube of the main frame of the armrest is determined by the height of the anchor (shown in Fig. 2). Any distance less than 3 1/2" will not allow the anchor to fit between the cross tube and the support. The height of the support will determine the height of the brace and associated lengths of the tubing that connect the brace to the wheelchair. The height of the brace corresponds to length FG shown in Fig. 4 and is 4 1/2" more than the distance from the support to the cross tube on the armrest. The major consideration in determining the length of tubing that connects the brace to the wheelchair, beside the height of the support, is that the tube should not interfere with the wheel and the brace should not block the brake lever. These generally are not problems when mounting to a motorized wheelchair, which has smaller wheels than a manual wheelchair.

It is recommended that the protective paper on the polycarbonate be left intact during construction and only be removed from areas during construction that are needed to attach clamps or cement polycarbonate together. This will help protect the polycarbonate from scratches and dust.

Brace

1) Cut diagonal BD from 12" square piece of Lexan (Fig. 4).

2) Add 4 1/2" to the distance between the support and the top of the cross tube on the main frame of the wheelchair armrest. Use this

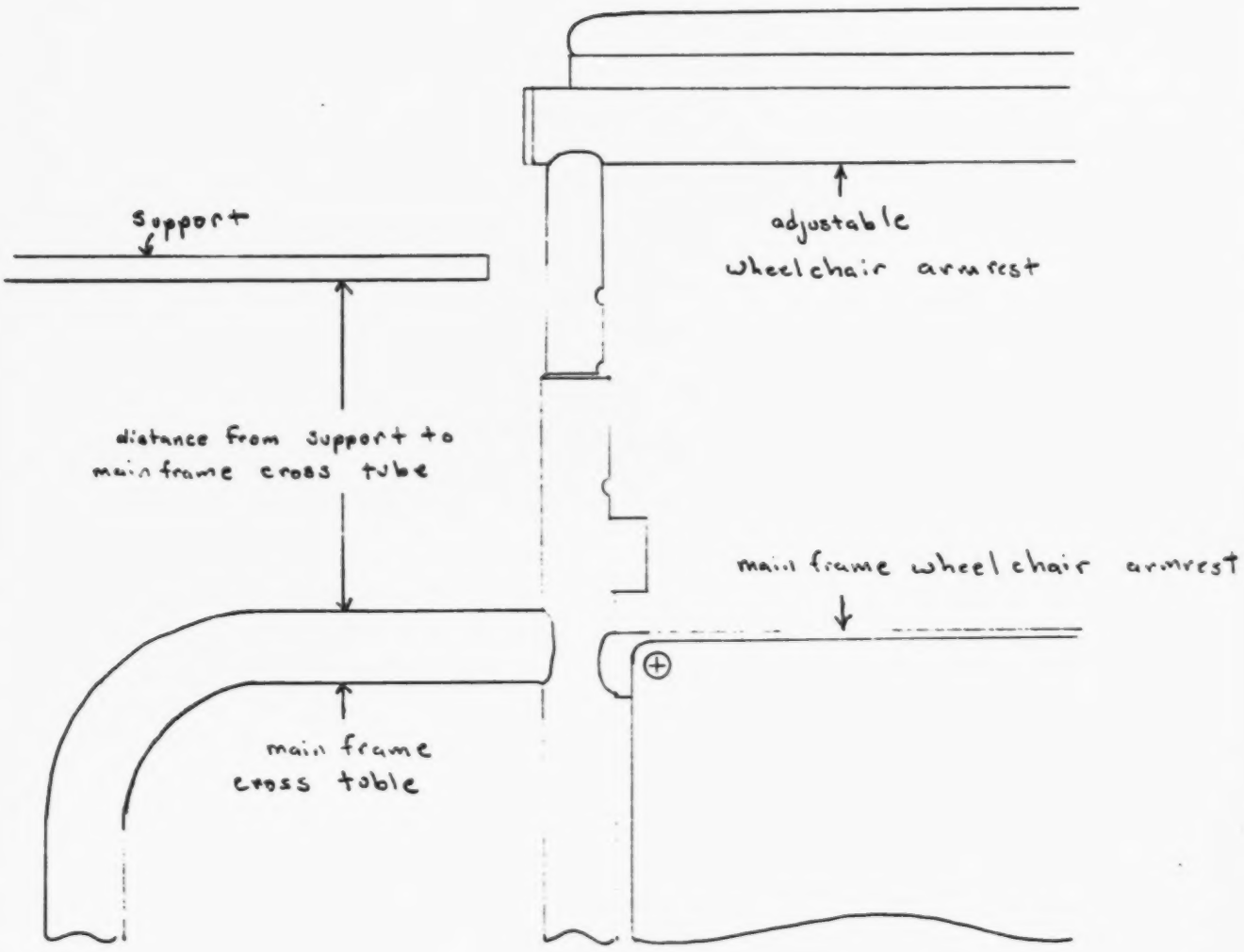


Fig. 8 Distance measurement of support above main frame cross tube.

distance for length FG on the brace and cut CF (Fig. 4).

3) Cut 1/2" wide notch along side FG so the notch ends 1 1/2" from side FC (Fig. 4).

4) Round off sharp edges with a file.

5) Drill 12 holes centered 1/4" from side AG beginning 1/4" from the notch on side FG and continuing at 1" intervals to side AB using a 5/32" drill bit (Fig. 4).

6) Drill 3 holes centered 1/4" from side FG beginning 1/4" from side CF spaced at 1/2" intervals using a 5/32" drill bit (Fig. 4).

7) Cut out 11 1/2" X 1" guard and 4" X 1" stop spacer from remaining piece of Lexan (Fig. 4).

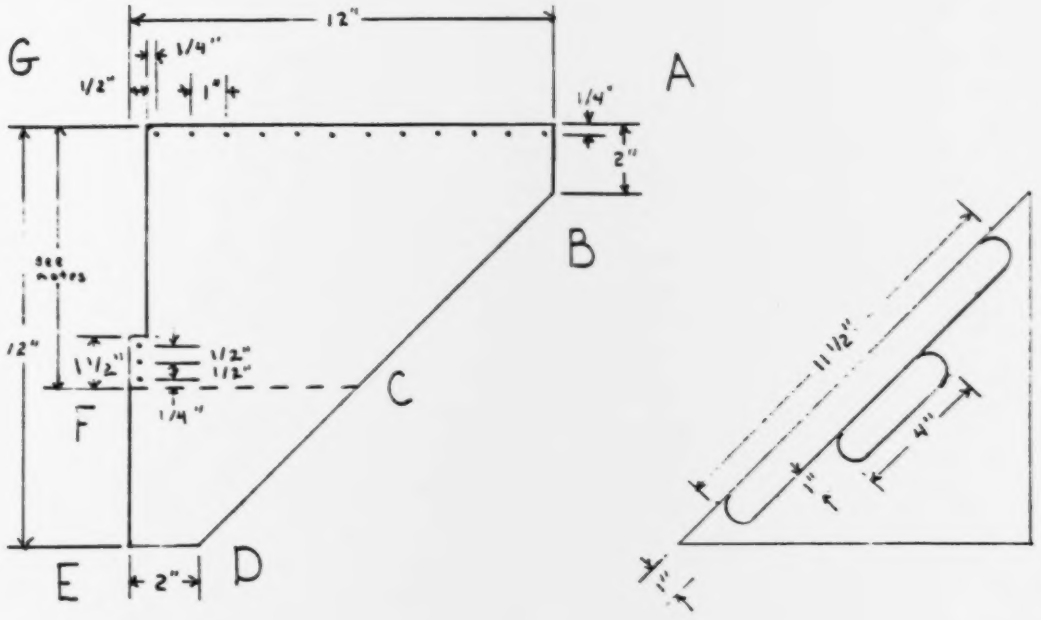


Fig. 4 Brace, guard and stop spacer

Support

1) To determine the width of the support, measure the distance between the outside of the armrests. Make sure this distance doesn't exceed the distance from the support surface to the top of the small wheels on the front of the wheelchair. If the support is longer than this distance it could jam the wheel when folded down to the side of the wheelchair.

2) Cut support to the width measured above and a depth of 12" (Fig. 5).

3) Round corners J and K to a 1" radius to remove sharp corners (Fig. 5).

4) Cut a 1/4" X 1/2" notch at corner H and remove sharp corner at I by filing it slightly (Fig. 5).

5) Drill 11 holes centered 1/4" from side HI beginning 3/4" from side IJ and continuing at 1" intervals to side KH using a 5/32" drill bit (Fig. 5)

6) Round off the corners and edges of the 11 1/2" X 1" Lexan guard and attach it to the bottom side of the support 3/4" from side HI and 1/4" from side IJ with polycarbonate adhesive (Fig. 5).

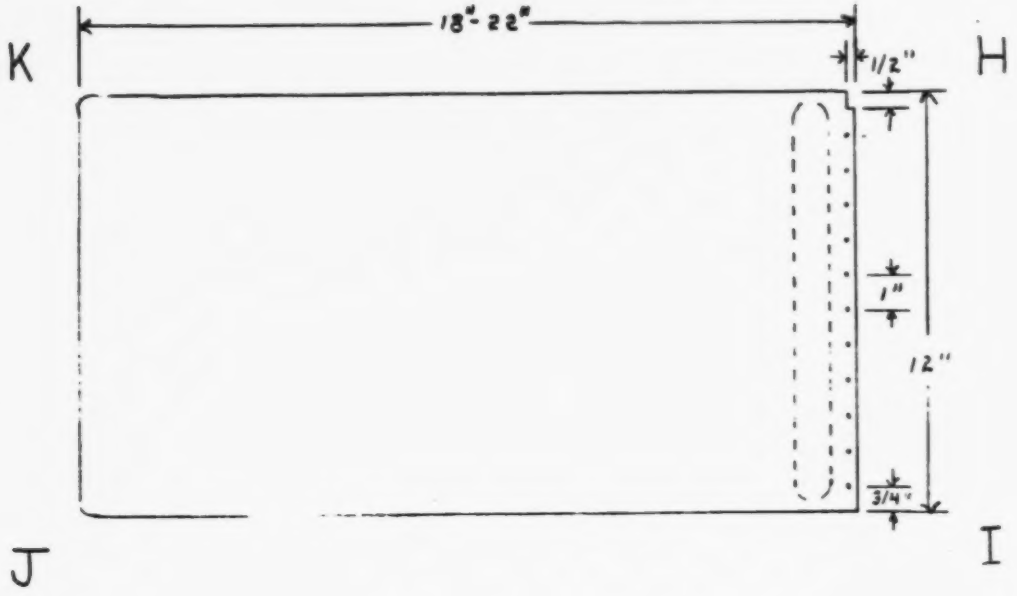


Fig. 5 Lap tray (top view, look down through support)

7) Round off the ends of the 1" X 4" Lexan spacer and iron plate with a 1/2" arc and file off the sharp edges (Fig. 6).

8) Using polycarbonate adhesive, attach the 1" X 4" Lexan spacer to the support 1/2" from side JK and 1/2" from side IJ and allow time to completely dry. The long side of the spacer and the long side of the support should be parallel to each other (Fig. 6).

9) Place the 1" X 4" iron plate on the matching Lexan spacer cemented onto the support. Drill and countersink two 1/8" holes centered on the spacer and 1/2" from each end of the iron and 3/8" into the Lexan (Fig. 6).

10) Use two #6 X 3/8" flat head sheet metal screws to fasten the iron plate onto the Lexan.

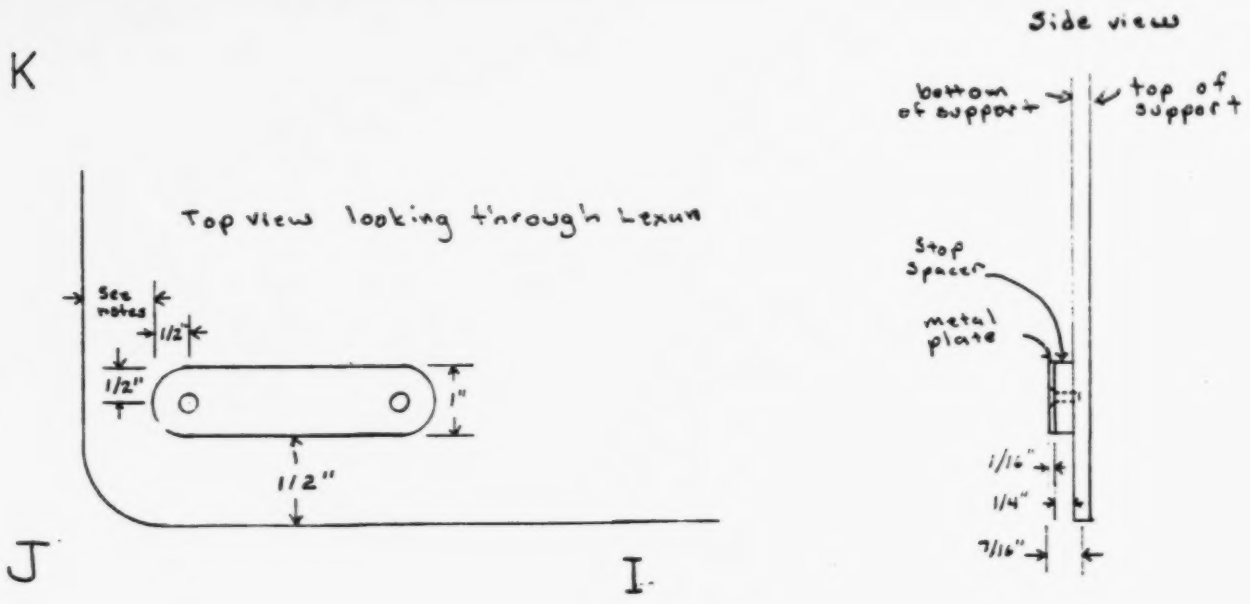


Fig. 6 Stop assembly

Arm

1) Cut two pieces of 5/8" O.D. tubing, one 12 1/2" and the other the length calculated for the height of the brace (side FG). Also cut one length of 7/8" O.D. PVC tubing 2 1/8" shorter than the height calculated for the brace (side FG) (Fig. 7).

2) Attach one end of each of the 5/8" O.D. pieces of PVC tubing to the PVC tube elbow with PVC cleaner and cement (Fig. 7).

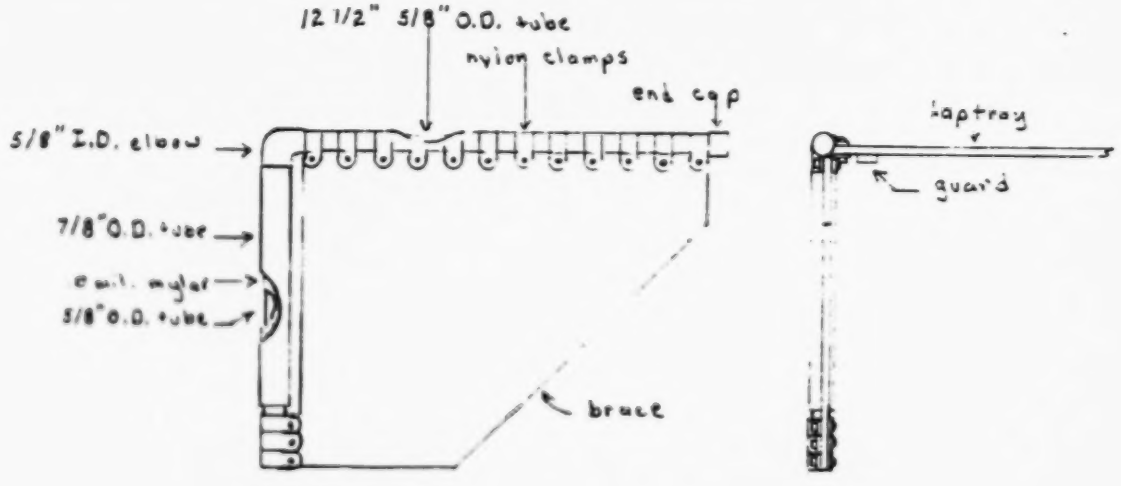


Fig. 7 Arm assembly

3) Slide 23 of the nylon clamps onto the 12 1/2" arm of 5/8" O.D. PVC tubing attached to the elbow. Begin with a clamp for the brace and alternate the orientation of the clamps so that the brace is aligned with the inside part of the tube and the support is aligned to the bottom part of the tube (Fig. 8).

4) Cement the PVC cap on to the end of the tube holding the clamps.

5) Using 6-32 X 1/2" pan head machine screws and nuts, attach the support to the 12 1/2" arm and the brace to the 11 1/2" arm, with the heads of the screws facing the top of the support and the inside of the brace (Fig. 8).

6) Cut the 9" X 2" piece of mylar a little less than the length of the 7/8" O.D. tube and then fold into thirds along the long axis and create two sharp creases.

7) Slide the 7/8" O.D. tube onto the remaining 5/8" O.D. tube attached to the elbow with the sheet of mylar in between the 7/8" O.D. tube and the 5/8" O.D. tube to provide friction for stability (Fig. 7).

8) Slide on and attach 3 nylon clamps to the brace as in instructions 3 and 5 of this section.

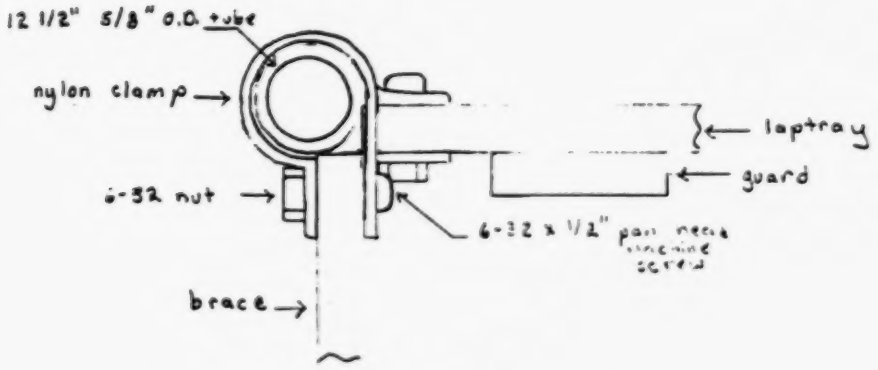


Fig. 8 Front view of nylon clamp assembly

Anchor

1) Drill a 7/8" diameter hole in the center of the 2 by 4 with a spade bit leaving at least 4" of free wood on one side of the hole (Fig. 9). Place a board under the 2 by 4 to reduce the amount of splintering when the spade bit breaks through the other side. You may try the following technique if you do not have a drill press or an attachment to a hand drill to hold the drill bit perpendicular to the wood:

   Drill a 3/16" hole centered on the 2 by 4 about halfway into the wood. Turn the wood over and drill a hole centered into the 2 by 4 to meet the hole drilled from the other side. This 3/16" hole now extends completely through the wood and provides a guide for the spade bit.

2) Cut off the end of the 2 by 4 so that a half circle remains on the side of the wood with 4" of wood left. Cut off the 2 by 4 3 1/8" from the end of the edge of the hole on the opposite end of the 2 by 4 (Fig. 9).

3) Cut a 1 1/8" X 1/2" slot in the 2 by 4 1" from the edge of the hole (Fig. 9).

4) Cut a 1" X 1" diagonal off the bottom front of the anchor (Fig. 9).

5) Using the screws included with the magnetic latch, attach the latch to the inside face of the anchor so the magnet is centered next to the slot, 3/8" below the top surface of the anchor (Fig. 10).

Anchor Positioning

1) Attach the support brace assembly to the wheelchair using the ZYGO clamps. The ZYGO clamps are designed to attach to a 5/8" and 7/8" tube, so one side of the clamp is larger than the other. Disassemble both clamps and turn one side over so that each side has a 5/8" and a 7/8" side and reassemble. One ZYGO clamp should attach just above the arm adjustment lock and the other clamp mounts just under the cross tube on the main frame of the armrest. For more stability the top ZYGO clamp can be moved to the end of the 7/8" O.D. tubing, if there is room (Fig. 9).

2) Position the clamps and the support to the height required for the disabled individual and mark the position of the anchor on the arm of the wheelchair (Fig. 11).

3) The position of the hole for the 1/4" bolt used to mount the anchor to the wheelchair should be centered in the area beginnig 1 1/4" from the top and ending 2 1/4" from the top. There are 3 places on a desk-length armrest wheelchair to drill a hole for the 1/4" bolt that attaches the anchor to the wheelchair and they are shown in Fig. 11.

   A) In a hole which has been predrilled on one side of the adjustiable arm support to lock the height of the armrest.

   B) A position 1/2" beneath position A, which is

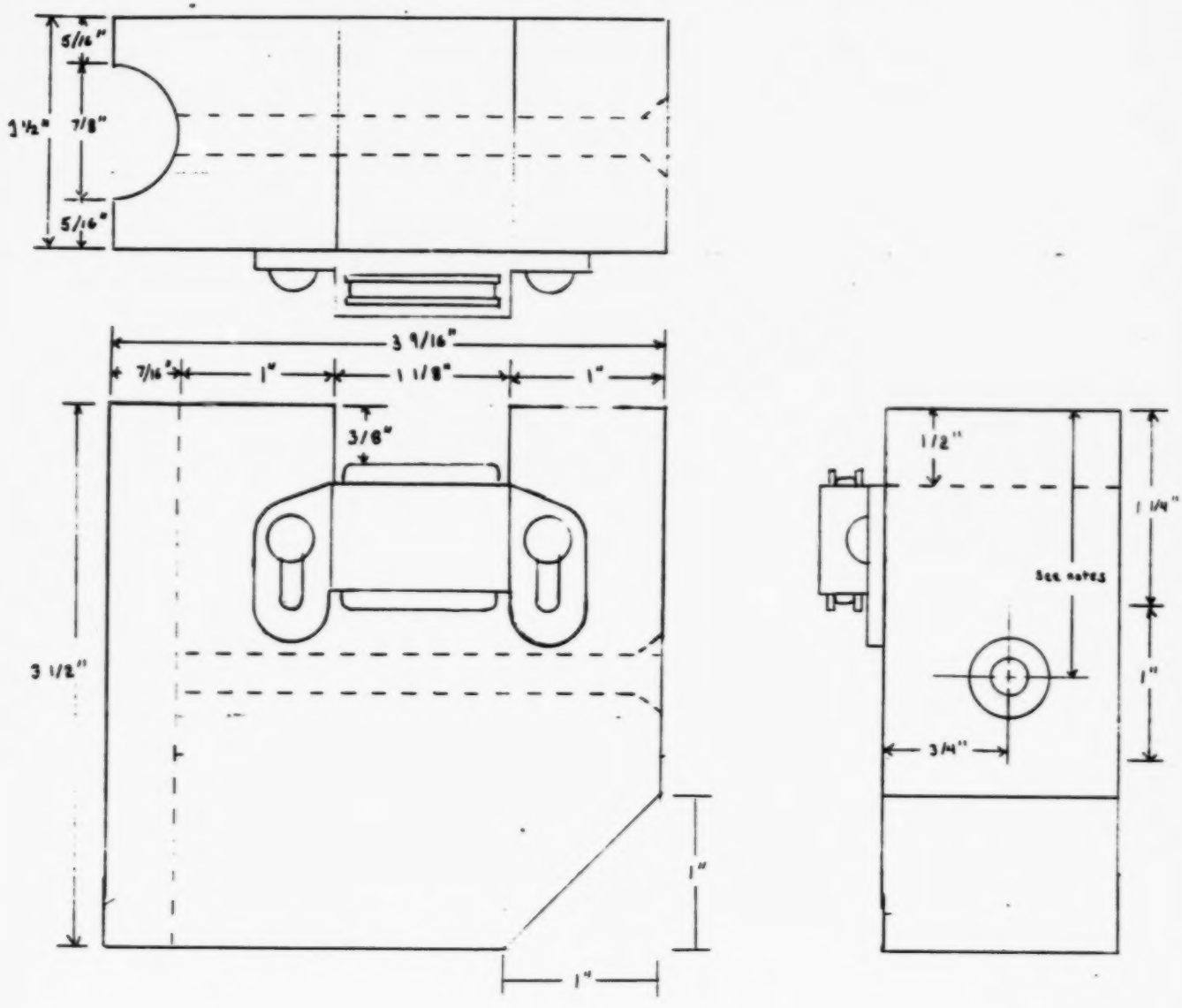
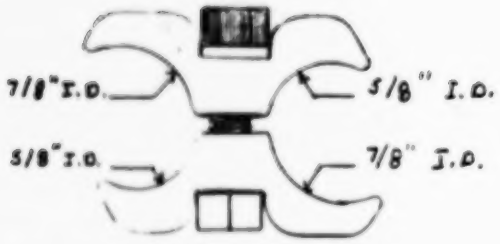


Fig. 9 Anchor



Zygo clamp reversed

Outside. view right side of wheel chair

Front view

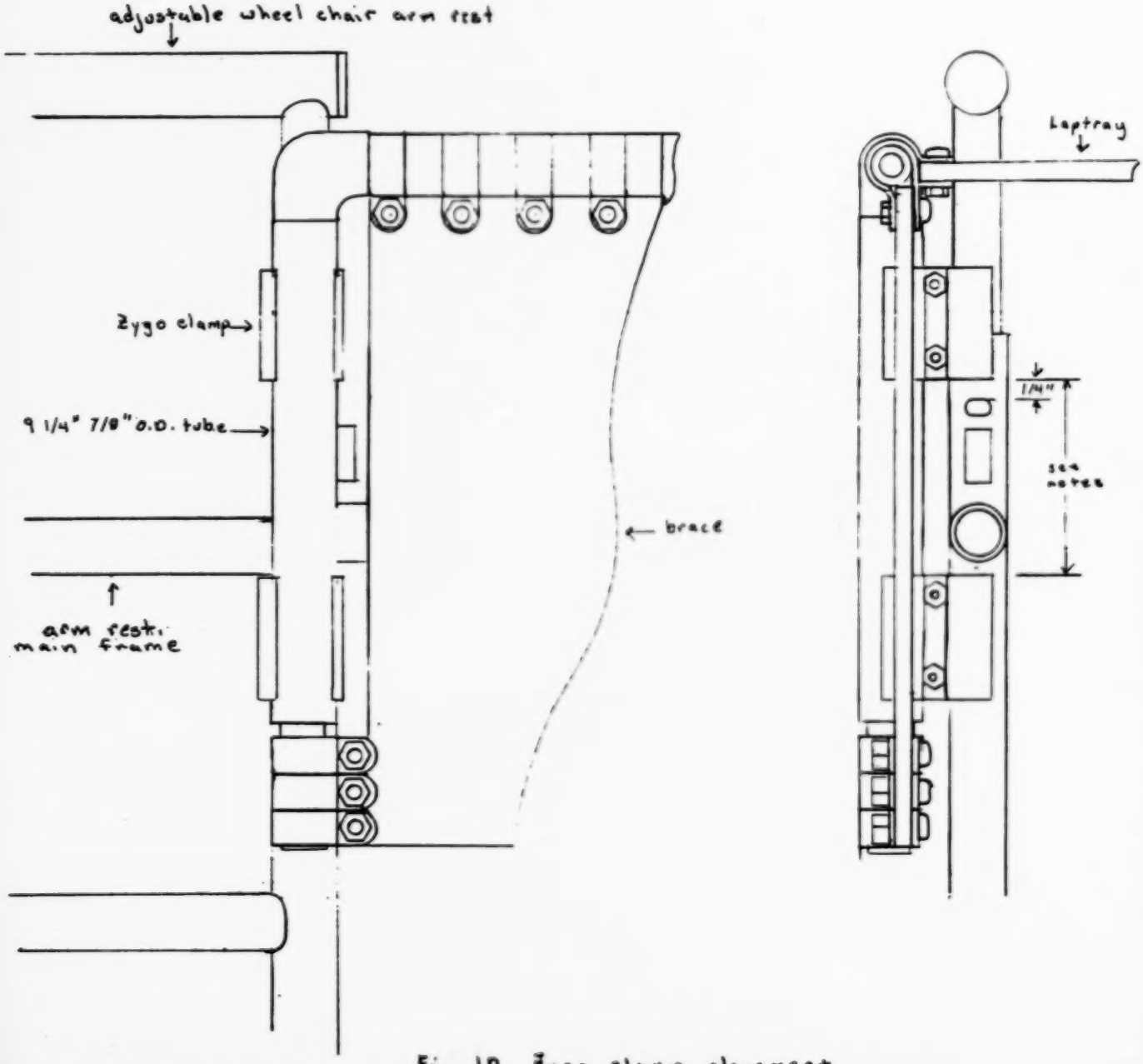


Fig. 10 Zygo clamp placement

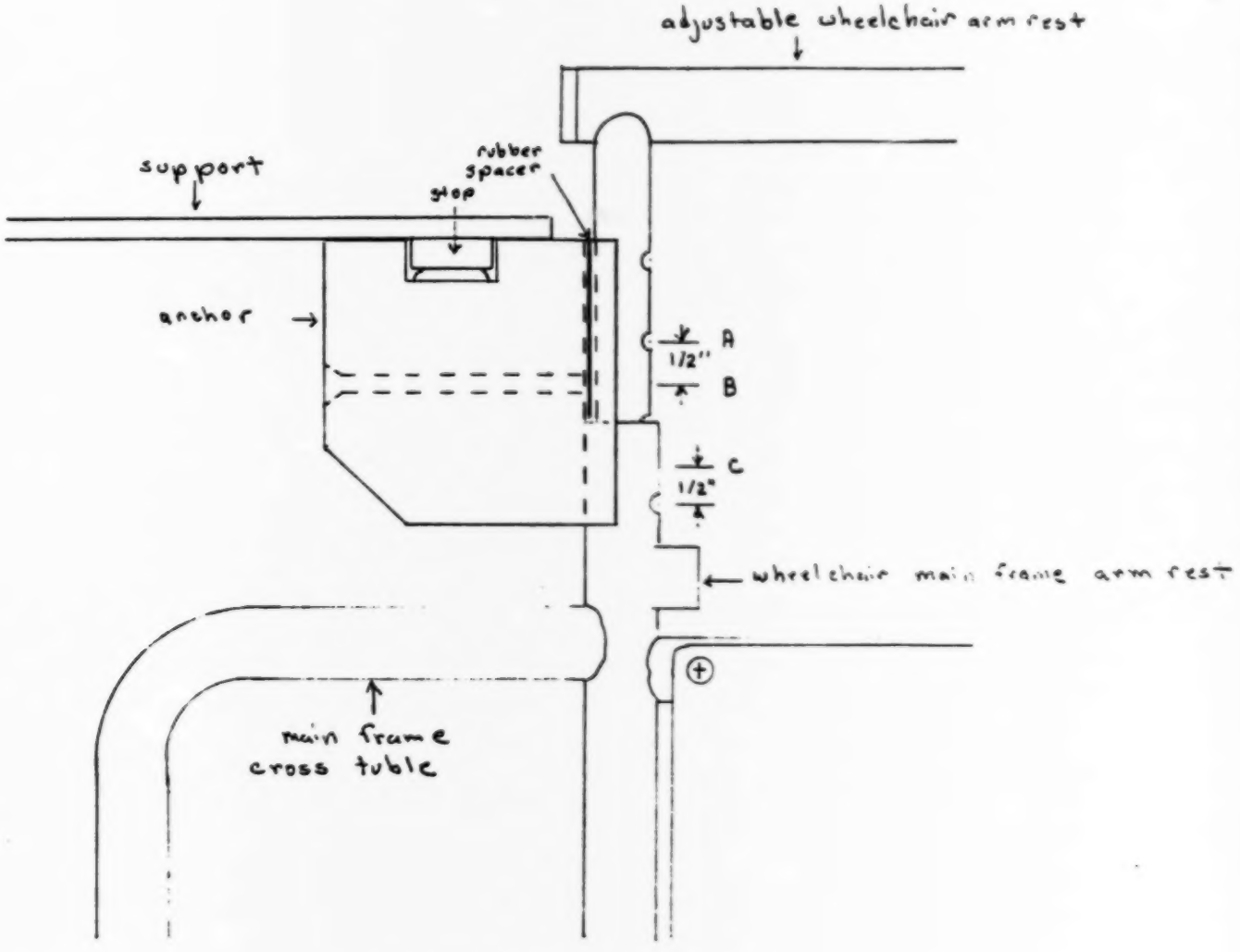


Fig. 11 Anchor placement (left arm view)

centered between position A and the next locking hole.

C) A position centered 1/2" above the locking post on the main frame of the wheelchair armrest.

4) Find the position A, B or C that best matches with the bolt placement area on the anchor and mark the position on the anchor. If the location is either B or C it is best to remove the arm from the chair and to use a drill press. If you don't have one we it is recommended that you try to borrow a neighbors or a friends because of the difficulty in cutting into the metal tubing with a hand drill.

5) Drill the 1/4" hole in the wheelchair armrest at the position found above. In position A this requires only to finish drilling the hole out the other side, in position B the hole must be drilled through both sides of the adjustable arm rest support, and for position C, a hole must be drilled through both main frame armrest and the adjustable armrest support extending into the main frame of the armrest.

6) Drill and countersink a 1/4" hole centered at the position marked on the anchor.

7) Place a piece of rubber between the anchor and the adjustable arm to compensate for the differing diameters of the main frame and adjustable arm, and cut off the excess rubber (Fig. 11).

8) Attatch anchor to the armrest using 1/4" X 41/2" bolt.

Handle

1) Find and mark a location on the bottom of the support that the person can reach and have enough strength to pull the support to the upright position.

2) Drill two pairs of 5/32" holes through the support 5" from each other, with each pair of holes 1" apart and placed at the location found above. Countersink the holes on the top of the support (Fig. 12).

3) Fold back 3/4" of cloth from each end and punch 4 holes through the cloth corresponding to the holes drilled above (Fig. 12).

4) Use four 6-32 X 1/2" flat head machine screws with nuts to attach the cloth handle (Fig. 12).

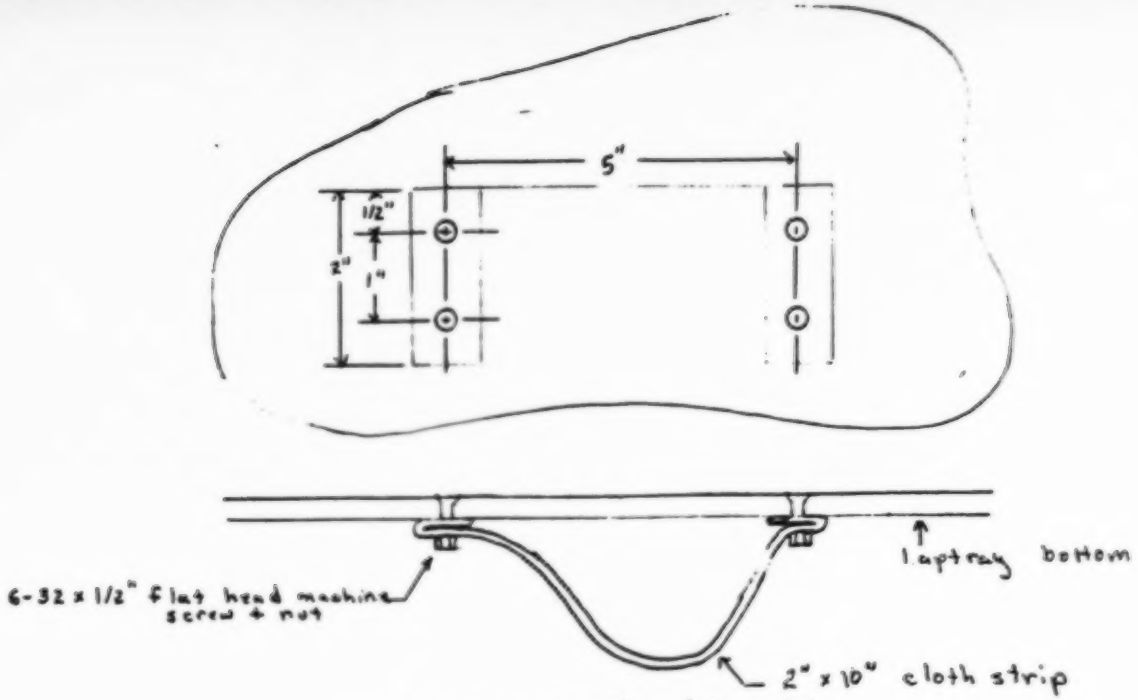


Fig. 12 - Handle Assembly

Broom Clamp

1) Open the support and make the brace flush with the wheelchair arm. Mark the position for the broom clamp to attach to the wheelchair frame (Fig. 13).

2) Drill and countersink one 3/16" hole on the brace 3" from side GH of the brace, centered in the middle of the cross tube on the main frame of the armrest (Fig. 13).

3) Use a 10-32 screw and nut to attach the broom clamp to brace.

FINAL INSPECTION

1) Round off all sharp corners which could injure the individual or damage people or furniture if hit by the support.

2) Adjust ZYGO clamps so that the broom clamp is properly aligned with the cross tube on the main frame of the armrest support. This helps keep the support from bouncing out of the anchor and not returning to the slot when going over bumps. This may require bending or removing the skirt guard on the side that the ZYGO clamps are attached.

3) Securely tighten the ZYGO clamps to keep them from loosening and allowing the laptray to fall.

4) It is advisable to use a polyurethane finish on the anchor to keep it from weathering. Polyurethane is available at any paint store.

5) Check to make sure that the brace and associated mounting tubes do not interfere with the normal operation of the wheels and brakes. If they do interfere, you will have to trim away the polycarbonate that is in the way.

6) If the magnet on the anchor is not sufficently strong to hold the support in the slot, you might try adding an additional magnet to the other side of the slot.

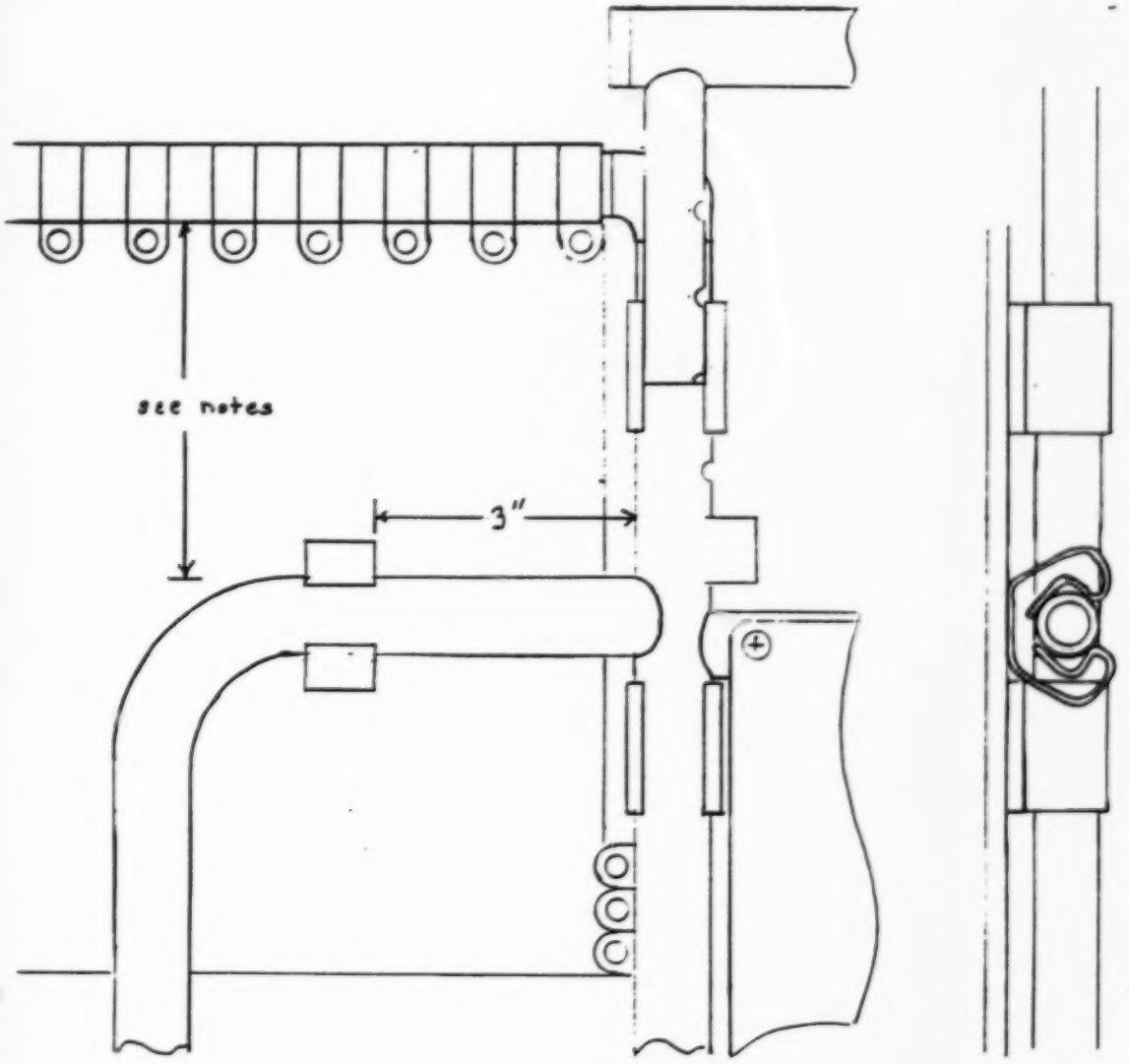


Fig.13 Broom clamp assembly

FOLDING COMMUNICATION BOARD
(PORTABLE COMMUNICATION BOARD)

Donna J. DePape
Cinda Bottorf

1981

Trace Center

Trace Research and Development Center
on Communication, Control, and Computer
Access for Handicapped Individuals
University of Wisconsin–Madison

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PORTABLE COMMUNICATION BOARD

These instructions will help you construct a 3 panel, folding case with pockets for inserting symbol displays. The board can have plastic pockets on both the front and back, or just the front. Two strap options are also explained. You can alter the dimensions any way you wish.

Materials

1 piece 25" x 18" rip-stop nylon
1 piece 12" x 18" clear vinyl
  or 2 pieces if double-sided board is desired
1 piece 2½" x 28" rip-stop nylon for strap
1 package (about 75") extra wide bias tape
Tagboard or heavy cardboard
  1 piece 6" x 12"
  2 pieces 5½" x 12"
1 gripper/snap set (For strap Option A)

STRAP

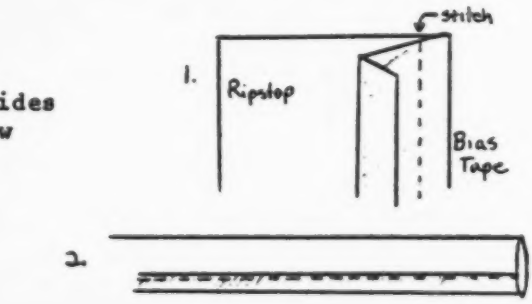
Option A: Strap is made as a loop, and attaches to board with a gripper, for fast release if grabbed, yanked, caught in a door, etc.

Option B: Strap is sewn directly to board either as a loop or in a purse-like manner.

Both Options

1. Unfold edge of bias tape and with right sides together, line up with edge of nylon. Sew along fold line of tape.

2. Fold nylon, wrong sides together so raw edges meet. Fold bias tape over raw edges and sew close to fold.

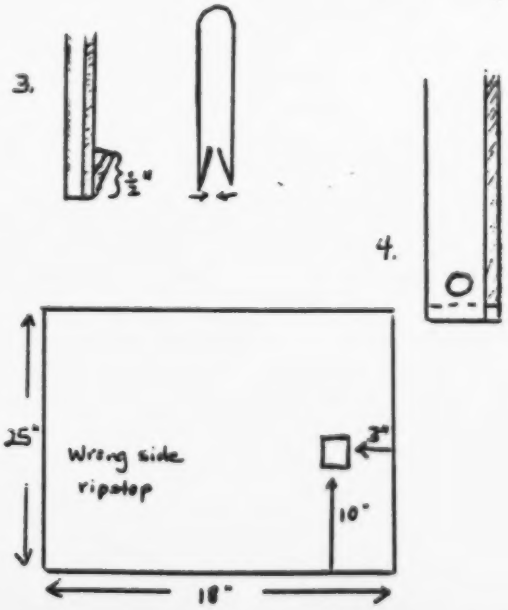


For Option A

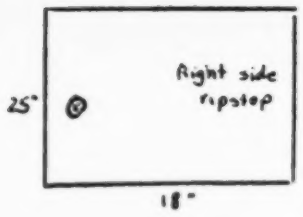
3. Fold raw edges of strap ends under ½", place ends together and stitch. The strap is now in a loop shape.

4. Through this double thickness of strap, insert and pound in the half of the gripper set that looks like a button.

5. The other half of the gripper set will be attached to the large rip-stop nylon rectangle. Take a piece of scrap cotton fabric, 2" x 3", fold in half, and placed on wrong sides of nylon as in drawing. (This is to provide a more secure hold for gripper.)



Pound in gripper so that snap connection is on the right side of the nylon.



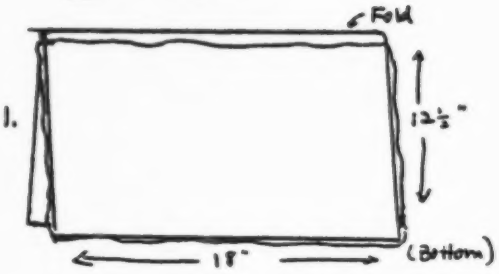
For Option B

a) Loop strap - proceed with step #3, and wait until step 6 of board construction to attach..

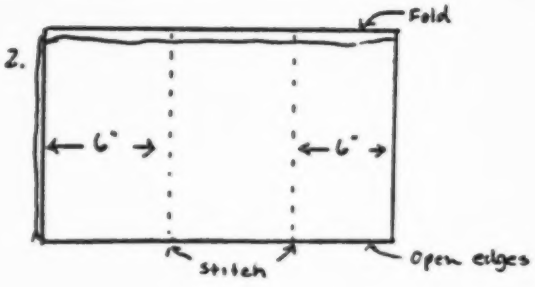
b) Purse-like strap - Fold under ½" of each strap end and stitch each separately. Attached at step 6 of board construction.

BOARD

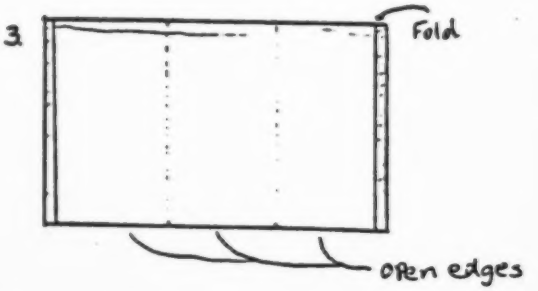
1. With wrong sides together, fold nylon in half, raw edges at the bottom. Place clear vinyl sheet(s) on front (and back, if using 2), lining up with side and bottom edges of nylon.

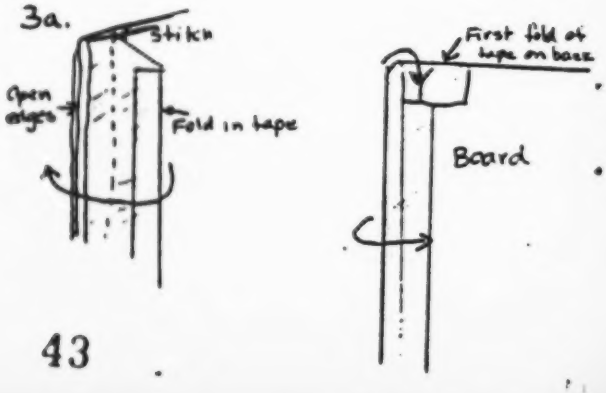


2. Measure in 6" from each side and mark a stitching line on the top layer of vinyl. Pin all layers together, making sure that both materials are lined up and smoothed out. Stitch length should be fairly long, as a shorter stitch tends to tear the vinyl.



3. Bind open side edges with bias tape. Bias tape can be attached by either: inserting the edges of board into fold of tape and stitching once, or stitching each flap of tape separately, as in drawing 3a. Be sure that nylon and vinyl are all caught in stitching and under the bias tape. Before sewing cut tape ½" longer than side length with this extra at top of board. Fold extra length down, and then fold bias tape over, for a clean finish at the top.

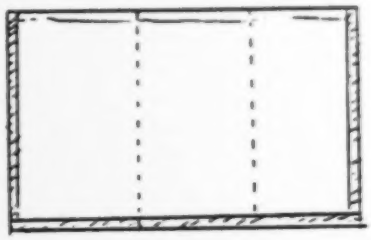




4. Insert cardboard into the pockets formed by stitching, between the two layers of rip-stop. Use smaller cardboard in the middle section.

5. Fold bias tape over bottom edges, making sure that vinyl and nylon are lined up. Clean finish the ends by folding extra ½" of tape under, as in step 3. Stitch tape to bottom edge.

5.

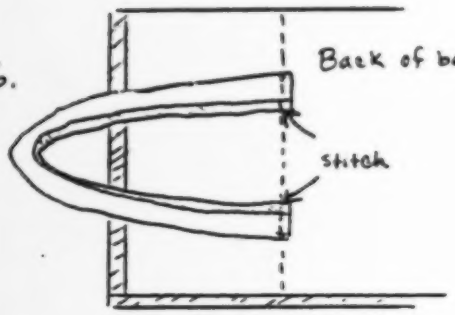


6. To attach Option B straps, sew strap end directly to board at the pocket stitch line on the outside of the board.

7. Fold board, with sides in toward middle. Small pieces of self sticking velcro can be used to keep book closed while carrying.

All clear vinyl pockets can now be used to hold vocabulary sheets.

6.



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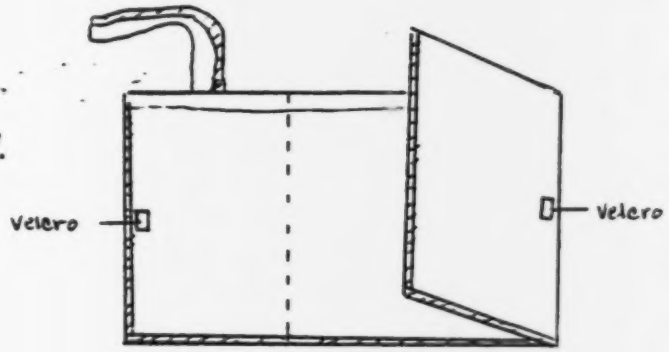

Bottorf/DePape
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